

Amendment and Response

Page 17 of 19

Serial No.: 10/028,040

Confirmation No.: 2997

Filed: December 21, 2001

For: METHODS FOR PLANARIZATION OF GROUP VII METAL-CONTAINING SURFACES USING COMPLEXING AGENTS

Remarks

The Office Action mailed October 3, 2003 has been received and reviewed. Claims 1, 6, 14, 16, 26, 28, 34, 37-41, 43, 46-50, 52, 55, and 56 having been amended, the pending claims are claims 1-58. Reconsideration and withdrawal of the rejections are respectfully requested.

The 35 U.S.C. §102 Rejection

The Examiner rejected claims 1-5, 8-13, 15-18, 21-25, 27-30, 32, 33, 35-37, 39, 41, 43, 45-46, 48, 50, 52, 54-55, and 57-58 under 35 U.S.C. §102 as being anticipated by Sachan et al. (U.S. Published Patent No. US 2002/0111027 A1). This rejection is respectfully traversed.

With respect to claims 1-5, 8-15, 39, and 48, the method involves using a planarization composition that includes a cyclic diene, an alkyl amine, or combinations thereof.

With respect to claims 16-27, 41, 42, 50, and 51, the method involves using a planarization composition that includes an alkyl amine and an organic chelating acid or salt thereof. Support for these amendments can be found in the specification at page 12, line 27 through page 13, line 6 as well as in claim 14, for example. Although the phrase "alkyl amine" is not literally used, it is fully supported by the list of amines recited in claim 14 and at page 13, lines 2-4. Ethylamine, methylamine, triethylamine, and trimethylamine are all alkyl amines, as opposed to mercaptoalkyl amines, the latter of which is a sulfur-containing compound and the only amine listed in claim 4 of Sachan et al.

With respect to claims 37, 46, 55, 57, and 58, the method involves using a planarization composition that includes a complexing agent selected from the group consisting of a cyclic diene, an alkyl amine, acetic acid, ascorbic acid, propenoic acid, succinic acid, salts of the acids, and combinations thereof. Sachan et al. disclose the use of one mercaptoalkyl amine, as opposed to alkyl amines (that do not include sulfur). The only organic acids listed in paragraph 0024 of Sachan et al. are citric acid, lactic acid, malic acid, and tartaric acid. Applicants' claims do not include such compounds.

Amendment and Response

Page 18 of 19

Serial No.: 10/028,040

Confirmation No.: 2997

Filed: December 21, 2001

For: METHODS FOR PLANARIZATION OF GROUP VII METAL-CONTAINING SURFACES USING
COMPLEXING AGENTS

With respect to claims 28-36, 43-45, and 52-54, the method involves using a planarization composition that includes abrasive particles, a majority of which are CeO₂ particles, and a complexing agent. Although Sachan et al. mentions CeO₂ particles as one type of abrasive, they also mention many others, such as diamond, alumina, etc. Also, all of the examples of Sachan et al. use alumina as the abrasive. Further, although Sachan et al. mention the use of abrasive slurries, they also mention the use of fixed abrasives. Thus, there is no teaching or suggestion of the specific combination of Applicants' claim elements. That is, there is no specific teaching or recognition in Sachan et al. of the advantages of the use of complexing agent with ceria in an abrasive slurry for planarizing a Group VIII metal-containing surface, particularly ruthenium (claim 30).

The 35 U.S.C. §103 Rejection

The Examiner rejected claims 6, 7, 19, 20, 31, 38, 40, 42, 44, 47, 49, 51, 53, 56 under 35 U.S.C. §103 as being unpatentable over Sachan et al. as applied previously, and further in view of Van Buskirk et al. (U.S. Patent No. 6,436,741). This rejection is respectfully traversed.

The Examiner points to paragraph 11 of Sachan et al. for the contention that "other chemicals that enhance the activity for removal of the polishing composition for attaining higher selectivity for removal of the target metal layer" are described. However, when paragraph 11 is read in context, these "other chemicals" are the organic additives and ligand-containing compounds described throughout Sachan et al. There is no teaching or suggestion that an oxidizing agent would be useful in combination with such compounds.

Furthermore, although Van Buskirk et al. do use an oxidizing agent, there is no motivation to combine this with the composition of Sachan et al.

Removal of this rejection is respectfully requested.

Amendment and Response

Page 19 of 19

Serial No.: 10/028,040

Confirmation No.: 2997

Filed: December 21, 2001

For: METHODS FOR PLANARIZATION OF GROUP VII METAL-CONTAINING SURFACES USING
COMPLEXING AGENTS

Summary

It is respectfully submitted that the pending claims 1-58 are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for
Micron Technology, Inc.

By
Mueeting, Raasch & Gebhardt, P.A.
P.O. Box 581415
Minneapolis, MN 55458-1415
Phone: (612) 305-1220
Facsimile: (612) 305-1228
Customer Number 26813

Date Jan. 5, 2004

By: Ann M. Mueeting
Ann M. Mueeting
Reg. No. 33,977
Direct Dial (612)305-1217

CERTIFICATE UNDER 37 CFR §1.8:

The undersigned hereby certifies that the Transmittal Letter and the paper(s), as described hereinabove, are being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Assistant Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 5th day of January, 2004, at 5:58 pm (Central Time).

By: Sara E. Olson
Name: Sara E. Olson